

## REMARKS

### Status of the claims

Claims 1-38 are pending. Claims 1-14 and 25-38 are rejected. Claims 1-3, 5-14, 25, 28-30, 33, 35-36, and 38 are amended. Claims 15-24 are withdrawn from consideration and canceled herein. New claims 39-53 are added. No new matter is added in any amended or new claim.

### Information Disclosure Statement

The Information Disclosure Statement, including Form 1449, filed on August 29, 2003, listed only International Publication **WO 01/07691** cited herein. No Supplemental IDS need be filed at this time.

### Amendment to the specification

The specification was amended to correctly identify the base plate by the reference numeral “42” as correctly disclosed on pg. 19, ll. 24-25 and as shown in Figures 2A-2C. No new matter was added.

### Amendment to the claims

Claims 6, 13, 25, 33 and 36 claims are amended to overcome claim objections. Claims 1 and 11 are amended to overcome rejection under 35 U.S.C. 112, second paragraph, as being indefinite. These claim amendments are discussed *infra*. Additional claim amendments are to simplify and/or to clarify claim language. No new matter is contained in any claim amendment. Applicants respectfully request reconsideration of the pending claims.

### Claim objections

The Examiner objects to claims 6 and 13 for lacking “is” before the term “controlled”. Claims 6 and 13 are amended to recite “is controlled”.

The Examiner objects to claims 25, 33 and 36 for depending from withdrawn claim 15. Claims 25, 33 and 36 are amended to include the limitations of claim 15 and new claims 39-42, 43-46 and 47-50 are corresponding to original claims 16-19 are added to depend properly from amended claims 26, 33 and 36, respectively, as discussed *supra*. Claims 15-24 are canceled.

#### **The 35 U.S.C. §112, Second Paragraph, Rejection**

Claims 1-14 and 25-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Applicants respectfully traverse this rejection.

The Examiner states that the first occurrence of “the deposition chamber” in independent claims 1, 11, 25, 33 and 36 lacks antecedent basis. Claims 1 and 11 are amended to recite “in a deposition chamber” after the word “susceptor” in the preamble. Respectfully, Applicants submit that the first recitation in independent claims 25, 33 and 36, as originally filed, is “a deposition chamber” (see line 4 in each claim). Accordingly, in view of the claim amendment presented herein, Applicants respectfully request that the rejection of claims 1-14 and 25-38 under 35 U.S.C. 112, second paragraph be withdrawn.

#### **The 35 U.S.C. §103(a) Rejection**

Claims 1-14 and 25-38 are rejected under 35 U.S.C. 103(a) as being obvious over **Sakai et al.** (U.S. Patent No. 4,737,824) in view of **WO 01/07691 (WO ‘691)**. Applicants respectfully traverse this rejection.

#### **Sakai et al. reference (U.S. 4,737,824)**

The Examiner states that **Sakai et al.** disclose a process for improving the planarity of a substrate support plate for use during a substrate process. The Examiner states that the process comprises adjusting pressure in a hollow core of a shaft below atmospheric pressure to act on the lower surface of the plate while pressure above the top surface acts on the upper surface to improve the planarity of the substrate during processing (Abstract; col. 2, ll. 30-40; col. 3; col. 4, ll. 10-25; col. 5, ll. 10-23, col. 6, ll. 25-40, col. 7, ll. 65-68; Fig. 2). Also, the Examiner states the **Sakai et al.** further disclose

providing an independently controlled vacuum chucking system (3a-3b in Fig. 2) and monitoring the flatness of the wafer during processing to adjust the pressure so that the desired planarity is achieved (col. 7, ll. 20-35; Fig. 2).

**WO 01/07691reference**

The Examiner states that **WO ‘691** discloses that it is critical to maintain substrates flat during the deposition of epitaxial layers in a deposition chamber at reduced pressure to prevent the edges of the substrate from curling and causing non-uniform coatings thereon (pg. 3, ll. 1-25).

**Sakai et al. with WO ‘691 as applied to claims 1, 11, 25, 33 and 36.**

The Examiner states that **Sakai et al.** teach all the elements of the claimed invention except reducing a pressure in a deposition chamber to a level required for deposition of a film onto the substrate. The Examiner states that **WO ‘691** remedies this deficiency. Thus, the Examiner states, it would have been prima facie obvious to have performed the method for improving planarity of the substrate in such a reduced pressure deposition chamber to prevent curling of the edges of the substrate during deposition.

The Examiner also states that even though neither **Sakai et al.** nor **WO ‘691** explicitly disclose the numerical values of the reduced pressure in the hollow shaft or the deposition chamber or the substrate temperatures recited in claims 11, 33 and 36, it is well-settled that “where the principal difference between the claimed process and that taught by the reference is a temperature difference, it is incumbent upon applicant to establish criticality of that temperature difference” (*Ex Parte Khusid* 174 USPQ 59). The Examiner states this principle clearly is applicable to other process parameters, such as pressure. Therefore, it is prima facie obvious to use pressures in the claimed range, absent evidence of criticality.

Applicants disclose methods of planarizing a susceptor and methods of film deposition. As compared to Applicants’ invention **Sakai et al.** disclose a device for changing the shape, including flatness or non-flatness, of a surface of a plate-like member, i.e., a semiconductor wafer (Abstract; col. 1, ll. 6-15; Fig. 1). The plate-like member is not

a supportive device nor does it comprise a susceptor. The device comprises a wafer chuck base with an upwardly extending annular support that chucks the periphery of the plate-like member or wafer via a vacuum, electrostatic attraction or mechanical means.

When the wafer is in position on the annular chuck, it defines a sealed circular recess underneath the wafer. A tube running through the base of the wafer chuck connects the circular recess to a vacuum pump and to an air pump. Adjusting the pressure in the recess up or down adjusts the planarity or convexity or concavity of the wafer surface to bring it into a predetermined relationship with a plane in which a pattern or mask will be printed (col. 2, ll. 20-36; col. 2, ll. 64 to col. 4, ll. 39-65). This prevents any deterioration of an image of a circuit pattern of mask projected onto the surface of the wafer due to focus error.

As compared to Applicants' invention, **WO 01/07691** teaches a method of keeping a wafer flat during deposition of epitaxial layers at reduced chamber pressure to prevent curling of the edges of later deposited epitaxial layers up and away from earlier deposited layers due to temperature differences between the layers (pg. 3, ll. 13-19). **WO 01/07691** discloses a substantially porous wafer carrier with wafer cavities to hold wafers. The wafer carrier is removably positioned on top of a non-porous susceptor both in connection with a hollow spindle. A vacuum is applied to the underside of the wafers in the wafer cavities through the porous wafer carrier via the hollow spindle to maintain the wafers in a substantially flat orientation within the wafer carrier (Abstract; pg. 7, ll. 24 to pg. 9, ll. 27; Fig. 2).

Both **Sakai et al.** and **WO 01/07691** teach methods of keeping a wafer or substrate flat during a substrate processing method by applying pressure through the support means, i.e., annular wafer chuck or removable porous wafer carrier, respectively, to the underside of the wafer supported thereon. The combination of **Sakai et al.** with **WO 01/07691** does not teach nor suggest methods of planarizing a substrate support plate to one of ordinary skill in the art. At a minimum, the vacuum pulled on the semiconductor wafers in either **Sakai et al.** or **WO 01/07691** cannot act upon the underside of the wafer chuck or the susceptor to improve its planarity because the openings therethrough align with the underside of the wafer. Therefore, the combination of any elements disclosed in

**Sakai et al.** and **WO 01/07691** cannot render the instant invention obvious as recited in independent claims.

In fact **Sakai et al.** teach away from a support plate surface that supports the entirety of the wafer during transfer of the circuit pattern, because the technique requires maintaining exact flatness of the wafer holding surface against temperature variation or the like. This requires increased manufacturing cost and complicated maintenance (col. 1, ll. 15-32). Instead **Sakai et al.** use an annular chuck to support only the wafer periphery and use pressure directly applied to the wafer to alter the shape of the wafer surface effectively eliminating the need to maintain a planarized support surface.

Claims 2-10, 12-14, 26-32 and 39-42, 34-35 and 43-46, and 37-38 and 47-50 depend directly or indirectly from amended independent claims 1, 11, 25, 33, and 36, respectively, and further limit the invention as recited therein. Thus, these dependent claims are allowable for the reasons stated *supra* in considering amended independent claims 1, 11, 25, 33, and 36, as well as for their respective attributes.

Applicants reiterate that in view of the arguments presented *supra*, the combination of **Sakai et al.** with **WO 01/07691** does not teach nor suggest methods of planarizing a support plate on a susceptor nor would one of ordinary skill in the art be motivated to do so in view of the combination. Therefore, as the instant invention, as recited in amended claims 1, 11, 25, 33, and 36 is both novel and non-obvious over the combination of **Sakai et al.** and **WO 01/07691**, then dependent claims 2-10, 12-14, 26-32, 34-35, 37-38 and new claims 39-50 also are non-obvious over the combination of **Sakai et al.** and **WO 01/07691**. Accordingly, in view of the claim amendments and arguments presented herein, Applicants respectfully request that the rejection of claim 1-14 and 25-38 under 35 U.S.C. 103(a) be withdrawn.

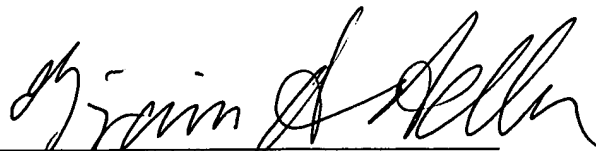
Applicants submit that claims 1-14 and 25-38 and new claims 39-50, as presented herein, are in condition for allowance. Accordingly, Applicants request that claims 1-14 and 25-38 and new claims 39-50 be passed to issuance. This is intended to be a complete response to the Office Action mailed May 28, 2004. Applicants submit that the If any issues remain outstanding, the Examiner is respectfully requested to telephone the undersigned attorney of record for immediate resolution. Applicants believe that no

fees are due, however, should this be in error, please debit Deposit Account No. 07-1185 on which the undersigned is allowed to draw.

Respectfully submitted,

Date: \_\_\_\_\_

8/5/04



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